No. IV.

A short and easy rule for finding the equation for the change of the sun's declination when equal altitudes are used to regulate a clock or other time keeper. Communicated by Andrew Ellicott Esq.

Read January 16th, 1801.

FOR THE FIRST PART.

FIND the Sun's longitude, declination, and the change of declination for 24^h at the time of the observation, likewise find the proportional part of the change of declination for the half interval between the forenoon and afternoon observations, then take the proportional logarithm answering to the change of declination for the half interval, (increasing the index by 10,) from which take the log. cosecant of the horary angle; to the remainder add the log. cotangent of the latitude of the place of observation, and take out the minute and second from the P. Ls. answering to the sum (10 being deducted from the index) which converted into time will give the first part of the correction and will be deductive in North latitudes, when the sun's longitude is 0, 1, 2, 9, 10, or 11, signs, and additive in the others; but the contrary in South latitudes.

FOR THE SECOND PART.

TO the P. L. of the change of the sun's declination during the half interval, add the log. cotangent of the sun's declination, from that sum deduct the log. cotangent of the horay angle.—Take out the minute and second from P. Ls. answering to the remainder, which turned into time will give the second part of the correction; this is common to all latitudes, and will be additive when the sun's longitude is 0, 1, 2, 6, 7, or 8, signs, and deductive in the others.

EXAMPLE.

Suppose the following equal altitudes were taken in latitude 39°.56′. *N. when the sun's longitude was* 4ˢ. 15°.

A. M. 8ʰ. 32′ 20″—P. M.	3ʰ	32′	24″
Add.....	12	0	0
	15	32	24
Deduct forenoon's observation.....	8	32	20
	2) 7	0	4
half interval.....	3	30	2
Add forenoon's observation.....	8	32	20
Sun's center on the meridian nearly	12	2	22

FOR THE CORRECTION.

The sun's declination answering to 4ˢ 15° of his longitude is nearly 16° 21′, and the change of declination at the same time about 16′ 55″ in 24 hours, or 2′ 28″ during the half interval.

THEN BY THE RULE.

Change of declination during half interval 2′ 28″ P. L.		11. 8631.
Horary angle 52° 30′ log. cosec.—		10. 1005
		1. 7626
Latitude 39° 56′ log. cotan. +		10. 0772
P. L.		1. 8398=2′ 36″=10″ 24‴in

time, being the first part of the equation, and additive by the rule.

FOR THE SECOND PART.

Change of declination during the half interval 2′ 28″ P. L.		1. 8631
Sun's declination 16° 21′ log cotan.	+	10. 5326
		12. 3957
Horary angle 52′ 30′ log. cotan.	—	9. 8850
P. L.	—	2. 5107=0′ 33″=2″ 12‴in

time, being the second part of the equation, and deductive by the rule.

APPLICATION.

Apparent time of the sun's center on the meridian by equal altitudes nearly		12ʰ 2′ 22″ 0‴
First part of the equation	+10″ 24‴	
Second do.....	— 2. 12	+8. 12
Sun's centre on the meridian		12. 2. 30. 12.

No. V.

Account of an extraordinary flight of meteors (commonly called shooting of stars) communicated by Andrew Ellicot, Esq. as extracted from his Journal in a voyage from New-Orleans to Philadelphia.

Read 16th January, 1801

"NOVEMBER 12th 1799, about three o'clock, A. M. I was called up to see the shooting of the stars (as it is commonly called.) The phenomenon was grand and awful, the whole heavens appeared as if illuminated with sky-rockets, which disappeared only by the light of the sun after day break. The meteors, which at any one instant of time appeared as nume-